STIC Search Report
EIC 1700

USPTO

STIC Database Tracking Number: 114948

TO: Lawrence D. Ferguson
Location: 5B71
Art Unit : 1774
February 25, 2004

Case Serial Number: 09/997107

From: Barba Koroma
Location: EIC 1700
REM EO4 A30
Phone: 571 272 2546

barba.koroma@uspto.gov

Search Notes

Examiner Ferguson,
Please find attached results of the search you requested. Various components of the claimed invention as spelt out in the claims were searched in multiple databases. For your convenience, titles of hits have been listed to help you peruse the results set quickly. This is followed by a detailed printout of records. Please let me know if you have any questions.
Thanks.

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=> file caplus
COST IN U.S. DOLLARS                                  SINCE FILE      TOTAL
                                                           ENTRY    SESSION
FULL ESTIMATED COST                                         0.42     738.69

FILE 'CAPLUS' ENTERED AT 11:20:44 ON 25 FEB 2004
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FILE COVERS 1907 - 25 Feb 2004  VOL 140 ISS 9
FILE LAST UPDATED: 24 Feb 2004  (20040224/ED)

  This file contains CAS Registry Numbers for easy and accurate
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=> file japio
COST IN U.S. DOLLARS                                  SINCE FILE      TOTAL
                                                           ENTRY    SESSION
FULL ESTIMATED COST                                         0.44     739.13

FILE 'JAPIO' ENTERED AT 11:21:33 ON 25 FEB 2004
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FILE LAST UPDATED: 3 FEB 2004        <20040203/UP>
FILE COVERS APR 1973 TO OCTOBER 31, 2003

<<< GRAPHIC IMAGES AVAILABLE >>>

=> file wpix
COST IN U.S. DOLLARS                                  SINCE FILE      TOTAL
                                                           ENTRY    SESSION
FULL ESTIMATED COST                                         1.27     740.40

FILE 'WPIX' ENTERED AT 11:21:38 ON 25 FEB 2004
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FILE LAST UPDATED:            23 FEB 2004      <20040223/UP>
MOST RECENT DERWENT UPDATE:      200413          <200413/DW>
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE
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>>> FOR A COPY OF THE DERWENT WORLD PATENTS INDEX STN USER GUIDE,
    PLEASE VISIT:
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    http://thomsonderwent.com/coverage/latestupdates/           <<<

>>> FOR INFORMATION ON ALL DERWENT WORLD PATENTS INDEX USER
    GUIDES, PLEASE VISIT:
    http://thomsonderwent.com/support/userguides/               <<<

>>> ADDITIONAL POLYMER INDEXING CODES WILL BE IMPLEMENTED FROM
    DERWENT UPDATE 200403.
    THE TIME RANGE CODE WILL ALSO CHANGE FROM 018 TO 2004.
    SDIS USING THE TIME RANGE CODE WILL NEED TO BE UPDATED.
    FOR FURTHER DETAILS: http://thomsonderwent.com/chem/polymers/ <<<


=> file inspec
COST IN U.S. DOLLARS                              SINCE FILE       TOTAL
                                                       ENTRY     SESSION
FULL ESTIMATED COST                                     1.92      742.32

FILE 'INSPEC' ENTERED AT 11:21:46 ON 25 FEB 2004
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FILE LAST UPDATED: 23 FEB 2004       <20040223/UP>
FILE COVERS 1969 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN
    THE BASIC INDEX >>>

=> d que
L38 (      92910)SEA FILE=CAPLUS ABB=ON  PLU=ON  OPTICAL? AND DEV/RL
L39 (        587)SEA FILE=CAPLUS ABB=ON  PLU=ON  L38 AND INDEX(3A)LAYER?
L40 (         17)SEA FILE=CAPLUS ABB=ON  PLU=ON  L39 AND BAND?(4A)GAP
L41 (          9)SEA FILE=CAPLUS ABB=ON  PLU=ON  L39 AND RELATIONSHIP?
L42 (          0)SEA FILE=CAPLUS ABB=ON  PLU=ON  L39 AND EMPIR?(4A)RELATIONSHIP?

L43 (          5)SEA FILE=CAPLUS ABB=ON  PLU=ON  L39 AND ALGORITHM?
L44 (         11)SEA FILE=CAPLUS ABB=ON  PLU=ON  L39 AND EQUATION?
L45 (         45)SEA FILE=CAPLUS ABB=ON  PLU=ON  L39 AND LAMBDA
L46 (         24)SEA FILE=CAPLUS ABB=ON  PLU=ON  L39 AND ?CONSTANT?
L47 (        145)SEA FILE=CAPLUS ABB=ON  PLU=ON  L39 AND WAVELENGTH?
L48 (         42)SEA FILE=CAPLUS ABB=ON  PLU=ON  L39 AND CONDUCT?
L49 (         37)SEA FILE=CAPLUS ABB=ON  PLU=ON  L39 AND HEAT?
L50 (        258)SEA FILE=CAPLUS ABB=ON  PLU=ON  (L40 OR L41 OR L42 OR L43 OR
                L44 OR L45) OR (L46 OR L47) OR (L48 OR L49)
L51 (          2)SEA FILE=CAPLUS ABB=ON  PLU=ON  L50 AND INDEX(4A)CONTRAST
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L52 (         24)SEA FILE=CAPLUS ABB=ON  PLU=ON  L50 AND LOW INDEX
L53 (         27)SEA FILE=CAPLUS ABB=ON  PLU=ON  L50 AND HIGH INDEX
L54 (         30)SEA FILE=CAPLUS ABB=ON  PLU=ON  (L51 OR L52 OR L53) AND
                 (ALGORITHM OR EQUATION OR LAMBDA OR WAVELENGTH)
L55 (          6)SEA FILE=CAPLUS ABB=ON  PLU=ON  (L51 OR L52 OR L53) AND (HEAT?
                 OR CONDUCT?)
L56 (         35)SEA FILE=CAPLUS ABB=ON  PLU=ON  (L54 OR L55)
L57 (       9118)SEA FILE=WPIX ABB=ON  PLU=ON  OPTICAL(5A)DEVICE AND (INDEX
                 LAYERS AND EQUATION OR CONSTANT OR ALGORITHM OR LAMBDA OR
                 WAVELENGTH OR SPEED(4A)LIGHT)
L58 (        142)SEA FILE=WPIX ABB=ON  PLU=ON  L57 AND (SERIAL OR PLURAL OR
                 MANY OR MULTIPLE OR SEVERAL)(4A)LAYER?
L61 (          2)SEA FILE=CAPLUS ABB=ON  PLU=ON  L58 AND INDEX?
L62 (         37)SEA FILE=CAPLUS ABB=ON  PLU=ON  L56 OR L61
L63 (          6)SEA FILE=CAPLUS ABB=ON  PLU=ON  HIGH INDEX CONTRAST(4A)MIRROR?

L66           43 SEA FILE=CAPLUS ABB=ON  PLU=ON  L62 OR L63
L67           17 SEA FILE=CAPLUS ABB=ON  PLU=ON  L66 AND MIRROR?
L68            9 SEA FILE=JAPIO ABB=ON  PLU=ON  L58 AND INDEX?
L69            2 SEA FILE=JAPIO ABB=ON  PLU=ON  L68 AND MIRROR?
L70           34 SEA FILE=WPIX ABB=ON  PLU=ON  L58 AND INDEX?
L71            3 SEA FILE=WPIX ABB=ON  PLU=ON  L70 AND MIRROR?
L74           29 SEA FILE=INSPEC ABB=ON  PLU=ON  MULTI-LAYER MIRROR?
L75            1 SEA FILE=INSPEC ABB=ON  PLU=ON  L74 AND REFRACTIVE?
L76            3 SEA FILE=INSPEC ABB=ON  PLU=ON  L74 AND CONDUCT?
L77            4 SEA FILE=INSPEC ABB=ON  PLU=ON  L75 OR L76
L78           25 DUP REM L67 L69 L71 L77 (1 DUPLICATE REMOVED)
```

=> d ti 1-25
YOU HAVE REQUESTED DATA FROM FILE 'CAPLUS, JAPIO, WPIX, INSPEC' - CONTINUE? (Y)/N:y

L78 ANSWER 1 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI Phase shifted microcavities

L78 ANSWER 2 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI Semiconductor saturable absorber device, and laser

L78 ANSWER 3 OF 25 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
TI Micro-electromechanical systems **mirror** for **optical** **device**, has base of photonic **device** with **multiple layer** coating comprising **layer** of silver or gold, layer of silicon oxide, layer of silicon, and layer of silicon oxynitride.

L78 ANSWER 4 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI High-quality AlInN for **high index contrast** Bragg **mirrors** lattice matched to GaN

L78 ANSWER 5 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN

TI Thermally and electrically conducting **high index contrast** multi-layer **mirrors** and devices

L78 ANSWER 6 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI Use of sol-gel hybrids for laser **optical** thin films

L78 ANSWER 7 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI Oxidized GaAs/AlAs **mirror** with a quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser

L78 ANSWER 8 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI Light-current characterization of dual-**wavelength** VCSELs

L78 ANSWER 9 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI Saturable Bragg reflectors and their use in mode-locked lasers

L78 ANSWER 10 OF 25 INSPEC (C) 2004 IEE on STN
TI An infinitely selective repair buffer for EUVL reticles.

L78 ANSWER 11 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI IV-VI compound mid-infrared high-reflectivity **mirrors** and vertical-cavity surface-emitting lasers grown by molecular-beam epitaxy

L78 ANSWER 12 OF 25 INSPEC (C) 2004 IEE on STN
TI EUV mask fabrication using Be-based multilayer mirrors.

L78 ANSWER 13 OF 25 JAPIO (C) 2004 JPO on STN
TI OPTICAL **WAVELENGTH** SELECTION ELEMENT, AND MANUFACTURE OF **OPTICAL DEVICE** AND ELEMENT USING THE SAME

L78 ANSWER 14 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI Room-temperature optically pumped CdHgTe vertical-cavity surface-emitting laser for the 1.5 μm range

L78 ANSWER 15 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI AlAsSb-based distributed Bragg reflectors using InAlGaAs as **high -index layer**

L78 ANSWER 16 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI Analytical design of double-chirped **mirrors** with custom-tailored dispersion characteristics

L78 ANSWER 17 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI Reflectors

L78 ANSWER 18 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI Laser strength **mirrors** for high-power NIR-region solid-state lasers

L78 ANSWER 19 OF 25 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
TI Light fixture for use as diffuse polarisers or diffuse **mirrors** - consisting of light source and optical element comprising first phase and

second phase discontinuous along at least two of any three mutually
perpendicular axes, disposed within first phase.

L78 ANSWER 20 OF 25 INSPEC (C) 2004 IEE on STN
TI Optical constants of materials for multilayer mirror applications in the
EUV/soft X-ray region.

L78 ANSWER 21 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI Aluminum surfaces to be used in lighting applications

L78 ANSWER 22 OF 25 JAPIO (C) 2004 JPO on STN FAMILY 1
TI **OPTICAL** SEMICONDUCTOR **DEVICE**

L78 ANSWER 23 OF 25 INSPEC (C) 2004 IEE on STN
TI New water-cooled argon ion laser-low-cost version.

L78 ANSWER 24 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI **High index contrast mirrors** for
optical microcavities

L78 ANSWER 25 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
TI Broadband low-reflectivity coating for semiconductor power lasers by
ion-beam and PECVD deposition

=> d all 1-25 178
YOU HAVE REQUESTED DATA FROM FILE 'CAPLUS, JAPIO, WPIX, INSPEC' - CONTINUE? (Y)/N:y

L78 ANSWER 1 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
AN 2003:58352 CAPLUS
DN 138:114807
ED Entered STN: 24 Jan 2003
TI Phase shifted microcavities
IN Stanley, Ross Peter
PA Ecole Polytechnique Federale de Lausanne (EPFL), Switz.
SO PCT Int. Appl., 33 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM G02B005-00
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)
Section cross-reference(s): 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	---------------	----	--------	---------------	--------
PI	WO 2003007028	A2	20030123	WO 2002-IB2794	20020715

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,

LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRAI WO 2001-IB1278 W 20010713

AB An **optically**-active multi-layer dielec. structure comprising an **optically** active zone between 2 **mirrors** forming a Fabry-Perot microcavity is described wherein the **optically** active zone comprises an **optically** active material of **wavelength** λ centered in a **layer** of high refractory **index** medium of **optical** thickness <. **lambda.**/2 surrounded by 2 **layers** of low refractory **index** medium each of **optical** thickness <**.lambda** ./4, the combined **optical** thickness of the 3 layers making up the **optically** active zone being ≤3 λ /4. The structure behaves like a λ /2 **high** **index** cavity except that there is a maximum of the **optical** field in the center of the cavity instead of the usual node. This phase-shifted structure is useful for planar light emitting devices, vertical cavity lasers, and photo-detectors.

ST phase shifted microcavity resonator

IT **Optical** resonators
(Fabry-Perot; phase shifted microcavities)

IT **Optical** detectors
(detectors containing phase shifted microcavities)

IT Electroluminescent devices
(light emitting devices containing phase shifted microcavities)

IT Cavity resonators
Quantum well devices
(phase shifted microcavities)

IT Lasers
(vertical cavity; lasers containing phase shifted microcavities)

IT 1303-00-0, Gallium arsenide (GaAs), uses 1344-28-1, Aluminum oxide, uses 22831-42-1, Aluminum arsenide (AlAs) 106218-95-5, Aluminum gallium arsenide (Al0.1Ga0.9As) 110584-29-7, Gallium indium arsenide (Ga0.83In0.17As)
RL: **DEV (Device component use)**; USES (Uses)
(light emitting device; phase shifted microcavities)

IT 7440-57-5, Gold, uses
RL: **DEV (Device component use)**; USES (Uses)
(**mirror**; phase shifted microcavities)

IT 7440-21-3, Silicon, uses
RL: **DEV (Device component use)**; MOA (Modifier or additive use); USES (Uses)
(n-dopant; phase shifted microcavities)

IT 7440-41-7, Beryllium, uses
RL: **DEV (Device component use)**; MOA (Modifier or additive use); USES (Uses)

(p-dopant; phase shifted microcavities)

L78 ANSWER 2 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
AN 2003:737079 CAPLUS
DN 139:252257
ED Entered STN: 19 Sep 2003
TI Semiconductor saturable absorber device, and laser
IN Weingarten, Kurt; Spuehler, Gabriel J.; Keller, Ursula; Thomas, David Stephen
PA Gigatera AG, Switz.
SO U.S. Pat. Appl. Publ., 23 pp.
CODEN: USXXCO
DT Patent
LA English
IC ICM H01S003-098
NCL 372018000
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2003174741	A1	20030918	US 2002-97500	20020314
PRAI	US 2002-97500		20020314		

AB According to the invention, a semiconductor saturable absorber **mirror** device for reflecting at least a proportion of electromagnetic radiation of essentially one given **optical** frequency impinging on said device, comprises a substrate with a Bragg reflector, and on top of this Bragg reflector a layered structure with at least one layer with saturable absorbing semiconductor material. A **low index** dielec. coating **layer** is placed on said outermost surface of said structure. The Bragg reflector and said layered structure are designed in a manner that the field intensity of radiation of said given frequency takes up a maximum at or near the interface between said structure and said dielec. material. The thickness of said dielec. coating layer may be varied and may for example be a quarter of a **wavelength** of said electromagnetic radiation in the dielec. material.
ST semiconductor saturable absorber laser
IT Electric insulators
(coatings; semiconductor saturable absorber devices and lasers)
IT Nonlinear **optical** materials
(gain medium; semiconductor saturable absorber devices and lasers)
IT Vapor deposition process
(metalorg., fabrication method; semiconductor saturable absorber devices and lasers)
IT Lasers
Saturable absorbers
(semiconductor saturable absorber devices and lasers)
IT Phosphate glasses
RL: **DEV (Device component use)**; USES (Uses)
(semiconductor saturable absorber devices and lasers)

IT 1314-37-0, Ytterbium oxide 12061-16-4, Erbium oxide
RL: NUU (Other use, unclassified); USES (Uses)
(dopant source; semiconductor saturable absorber devices and lasers)
IT 7440-00-8, Neodymium, uses 7440-52-0, Erbium, uses 7440-64-4, Ytterbium, uses
RL: **DEV (Device component use)**; MOA (Modifier or additive use); USES (Uses)
(dopant; semiconductor saturable absorber devices and lasers)
IT 12005-21-9, YAG 22723-67-7, Gadolinium potassium tungsten oxide (GdKW2O8) 23108-36-3, Lithium yttrium fluoride liyf4
RL: **DEV (Device component use)**; USES (Uses)
(gain medium; semiconductor saturable absorber devices and lasers)
IT 1303-00-0, Gallium arsenide, uses 1344-28-1, Alumina, uses 7440-21-3, Silicon, uses 7631-86-9D, Silicon dioxide, non-stoichiometric 12033-89-5, Silicon nitride, uses 12258-40-1, Gallium indium arsenide ga0.75in0.25as 13463-67-7, Titania, uses 22398-80-7, Indium phosphide, uses 22831-42-1, Aluminum arsenide 106070-25-1, Gallium indium arsenide 106097-59-0, Gallium indium arsenide ga0.47in0.53as 106312-11-2, Aluminum indium arsenide al0.48in0.52as 128247-82-5, Gallium indium arsenide ga0.77-1in0-0.23as 154235-66-2, Aluminum gallium indium arsenide al0.07ga0.41in0.52as 156739-92-3, Gallium indium arsenide nitride ((Ga,In)(As,N)) 193619-56-6, Gallium indium arsenide phosphide ga0.35in0.65as0.73p0.27
RL: **DEV (Device component use)**; USES (Uses)
(semiconductor saturable absorber devices and lasers)

L78 ANSWER 3 OF 25 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 2003-830084 [77] WPIX
DNN N2003-663203 DNC C2003-233834
TI Micro-electromechanical systems **mirror** for **optical device**, has base of photonic **device** with **multiple layer** coating comprising **layer** of silver or gold, layer of silicon oxide, layer of silicon, and layer of silicon oxynitride.
DC L03 U11 U12 V07
IN GOLDSTEIN, M
PA (GOLD-I) GOLDSTEIN M
CYC 1
PI US 2003155632 A1 20030821 (200377)* 9p H01L023-58
ADT US 2003155632 A1 US 2002-79614 20020219
PRAI US 2002-79614 20020219
IC ICM H01L023-58
ICS H01L021-31
AB US2003155632 A UPAB: 20031128
NOVELTY - A micro-electromechanical systems **mirror** comprises:
(i) a base of a photonic device; and
(ii) a **multiple layer** coating on the base
comprising a first layer of silver or a layer of gold, a second layer of silicon oxide, a third layer of silicon, and a fourth layer of silicon oxynitride.
DETAILED DESCRIPTION - A micro-electromechanical systems **mirror** comprises:

(a) a base of a photonic device (100);
(b) a **multiple layer** coating (101) on the base.
The **multiple layer** coating includes a first layer of silver or a layer of gold having a physical thickness of at least 100 nanometers, a second layer of silicon oxide having an optical thickness of a first percentage of a quarter of a **wavelength** of interest within a band of **wavelengths** of interest, a third layer of silicon having an optical thickness of a second percentage of a quarter of the **wavelength**, and a fourth layer of silicon oxynitride (SiOxNy) having an optical thickness of a third percentage of a quarter of the **wavelength** and a ratio of Ny in the fourth layer of silicon oxynitride includes values within Ny (60%) to Ny (20 %).

INDEPENDENT CLAIMS are also included for:

(a) a system comprising a micro-electromechanical system (MEMS) platform; and a **mirror** coupled to the MEMS platform, comprising a **multiple layer** coating having a stress tunable from tensile to compressive and a shape tunable from convex to concave;

(b) a method for manufacturing an apparatus comprising forming a layer of silver having a first physical thickness on a substrate; forming a layer of silicon oxide having a second physical thickness on the layer of silver; forming a layer of silicon having a third physical thickness on the layer of silicon oxide; and a tuning layer of silicon oxynitride on the layer of silicon to a fourth physical thickness, a ratio of Ny within a range of interest, and an optical thickness of a percentage of a quarter of a **wavelength** of interest within a band of **wavelengths** of interest.

USE - As a micro-electromechanical systems **mirror** useful for an **optical device.**

ADVANTAGE - The apparatus has a high reflector tunable stress coating.

DESCRIPTION OF DRAWING(S) - The figure shows a cross-section view of a photonic device.

Photonic device 100
Multiple layer coating 101

Dwg.1/7

FS CPI EPI
FA AB; GI
MC CPI: L03-G02; L03-G02D
EPI: U11-C18C; U11-D01C9; U12-B03F1; V07-K05

L78 ANSWER 4 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
AN 2003:581605 CAPLUS
DN 139:267673
ED Entered STN: 30 Jul 2003
TI High-quality AlInN for **high index contrast** Bragg **mirrors** lattice matched to GaN
AU Carlin, J.-F.; Ilegems, M.
CS Institute of Quantum Electronics and Photonics, Swiss Federal Institute of Technology/Ecole Polytechnique Federale, Lausanne EPFL, CH 1015, Switz.
SO Applied Physics Letters (2003), 83(4), 668-670
CODEN: APPLAB; ISSN: 0003-6951
PB American Institute of Physics

DT Journal
LA English
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76

AB The growth by OMVPE is reported of high-quality Al1-xInxN layers and AlInN/GaN Bragg **mirrors** near lattice matched to GaN. Layers are grown on a GaN buffer layer with no cracks over full 2 in Al2O3 wafers. The index contrast relative to GaN is .apprx.7% for λ = 450-950 nm. The growth is demonstrated of a crack-free, 20 pairs Al0.84In0.16N/GaN distributed Bragg reflector centered at 515 nm with an >90% reflectivity and a 35 nm stop band. The growth of high quality AlInN lattice matched to GaN may represent a breakthrough in GaN-based optoelectronics which is presently limited by the lack of a high-index-contrast and high-band gap lattice-matched material.

ST aluminum indium nitride index contrast Bragg **mirror** lattice matched

IT **Mirrors**
(Bragg; high-quality aluminum indium nitride for high index contrast lattice matched to gallium nitride)

IT Refractive index
(high-quality aluminum indium nitride for high contrast Bragg **mirrors** lattice matched to gallium nitride)

IT Distributed Bragg reflectors
(high-quality aluminum indium nitride for high index contrast lattice matched to gallium nitride)

IT Metalorganic vapor phase epitaxy
Optical reflection
X-ray diffraction
(of high-quality aluminum indium nitride for **high index contrast** Bragg **mirrors** lattice matched to gallium nitride)

IT 177023-61-9, Aluminum indium nitride (Al0.85In0.15N) 329350-27-8, Aluminum indium nitride (Al0.84In0.16N)
RL: DEV (Device component use); USES (Uses)
(for **high index contrast** Bragg **mirrors** lattice matched to gallium nitride)

IT 25617-97-4, Gallium nitride
RL: NUU (Other use, unclassified); USES (Uses)
(high-quality aluminum indium nitride for **high index contrast** Bragg **mirrors** lattice matched to)

RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Asano, T; Phys Status Solidi A 1999, V176, P23 CAPLUS
(2) Brunner, D; J Appl Phys 1997, V82, P5090 CAPLUS
(3) Diagne, M; Appl Phys Lett 2001, V79, P3720 CAPLUS
(4) Fernandez, S; Phys Status Solidi A 2002, V192, P389 CAPLUS
(5) Langer, R; Appl Phys Lett 1999, V74, P3610 CAPLUS
(6) Lukitsch, M; Appl Phys Lett 2001, V79, P632 CAPLUS
(7) Macleod, H; Thin-film Optical Filters 1985, P165
(8) Matsuoka, T; Appl Phys Lett 1997, V71, P105 CAPLUS
(9) Nakada, N; Appl Phys Lett 2000, V76, P1804 CAPLUS

(10) Nakada, N; J Cryst Growth 2002, V237, P961
(11) Natali, F; Appl Phys Lett 2003, V82, P499 CAPLUS
(12) Peng, T; Appl Phys Lett 1997, V71, P2439 CAPLUS
(13) Someya, T; Appl Phys Lett 1998, V73, P3653 CAPLUS
(14) Waldrip, K; Appl Phys Lett 2001, V78, P3205 CAPLUS
(15) Yamaguchi, S; J Cryst Growth 1998, V195, P309 CAPLUS

L78 ANSWER 5 OF 25 CAPLUS
AN 2002:425242 CAPLUS
ED Entered STN: 06 Jun 2002
TI Thermally and electrically conducting **high index contrast** multi-layer **mirrors** and devices
IN Lim, Desmond R.; Wada, Kazumi; Kimerling, Lionel C.
PA Massachusetts Institute of Technology, USA
SO PCT Int. Appl.
CODEN: PIXXD2
DT Patent
LA English
IC ICM G02B005-08
ICS G02B005-28; H01S005-18
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002044767	A2	20020606	WO 2001-US44589	20011129
	WO 2002044767	A3	20030814		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	AU 2002019918	A5	20020611	AU 2002-19918	20011129
	US 2002089637	A1	20020711	US 2001-997107	20011129
PRAI	US 2000-253910P	P	20001129		
	WO 2001-US44589	W	20011129		

AB An optical device is provided. The optical device includes a plurality of high index layers. The optical device also includes a plurality of low index layers. The optical device is formed by creating alternating layers of the plurality of high layers and the plurality of low index layers, such that electricity and heat is allowed to be conducted through said optical device.

L78 ANSWER 6 OF 25 CAPLUS
AN 2002:825990 CAPLUS
DN 138:128709
ED Entered STN: 30 Oct 2002
TI Use of sol-gel hybrids for laser **optical** thin films
AU Belleville, Philippe; Prene, Philippe; Bonnin, Claude; Montouillout, Yves
CS CEA/Le Ripault, Monts, 37260, Fr.

SO Materials Research Society Symposium Proceedings (2002), 726(Organic/Inorganic Hybrid Materials--2002), 369-380
CODEN: MRSPDH; ISSN: 0272-9172
PB Materials Research Society
DT Journal
LA English
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
AB The CEA/DAM MJ-class pulsed Nd:glass laser devoted to Inertial Confinement Fusion (ICF) research is requiring 7,000-m2 of coated area onto 10,000 **optical** components. Among these different optics, two specific examples of applied sol-gel chemical will be described. First one is dealing with the 240 44-cm square cavity-end **mirrors** needing to be highly-reflective (HR)-coated onto deformable substrates. Such large dielec. **mirrors** are using interference quaterwave stacks of SiO2 and ZrO2-PVP (PolyVinylPyrrolidone) thin films, both starting from sol-gel colloidal suspensions (sols). The ZrO2-PVP **high index layer** is a nanohybrid material prepared from mixing nanosized-zirconia suspension with a transparent polymer solution (PVP). The oxide/polymer ratio of the hybrid system was optimized regarding refractive index value and laser damage threshold. UV-curing of the nanohybrid has enabled **optical** coating stacking up to 20 layers, achieving 99% min. reflection over the whole coated surface. FTIR spectroscopy was used to highlight particles/polymer chemical interactions and also polymer modifications under UV-irradiation Second example is concerning development of a SiO2-based hybrid material to protect Ag-coated light reflector used in laser pumping cavity. These metallic reflectors require a protective overlayer to preserve high-reflectivity front surfaces for long periods of operation under intense broadband flashlamp light and typical airborne contaminants. The so-called ormosil coating was optimized in term of thickness and composition to enhance Ag resistance to oxidation and tarnishing under UV-irradiation, to protect Ag layer from clean-room cleaning procedure, to withstand 10,000 flashlamp glow-discharges exposure with the lowest possible change in the reflection value. To fulfil these requirements, the developed hybrid sol-gel material acts as an oxidation dense barrier, is chemical-resistant, is durable and remain transparent in the 400-1000 nm **wavelength** range. Also, the sol-gel process allows industrial protective coating deposition onto large-sized and multi-shaped reflectors. These new protected reflectors will need to be replaced much less often than reflectors employed in current solid-state lasers, ensuring both higher performance and lower operating costs.

ST sol gel hybrid **optical** film laser **mirror** refractive index

IT **Mirrors**
(dielec.; use of sol-gel hybrids for laser **optical** thin films)

IT Coating process
Laser **mirrors**
Optical films
Refractive index

Sol-gel processing
(use of sol-gel hybrids for laser **optical** thin films)

IT 1314-23-4, Zirconia, properties 7631-86-9, Silica, properties
9003-39-8, PolyVinylPyrrolidone
RL: **DEV (Device component use)**; PRP (Properties); USES (Uses)
(use of sol-gel hybrids for laser **optical** thin films)

RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Bassner, S; The American Ceramic Society Bulletin 1998
(2) Belleville, P; 24th Boulder Damage Symposium Proceedings 1992, VSPIE 1848, P290
(3) Floch, H; FR 9208524 1992
(4) Floch, H; FR 9308762 1993
(5) Floch, H; Am Ceram Soc Bull P12
(6) Floch, H; Am Ceram Soc Bull 1995, V74(10), P11
(7) Fowkes, F; Ceramic Powder Science 1989, V21, P411
(8) Guglielmi, M; Journal of Sol-Gel Science and Technology 1997, V8, P443 CAPLUS
(9) Morales, A; Journal of Sol-Gel Science and Technology 1997, V8, P451 CAPLUS
(10) Somiya, S; Ceramic Powder Science 1987, V21, P43 CAPLUS
(11) Stoeber, W; J Colloid Interface Sci 1968, V26, P62 CAPLUS
(12) Thomas, I; SPIE's Proc 1993, V1848, P281
(13) Toki, M; Polymer Bulletin 1992, V29, P653

L78 ANSWER 7 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2002:913540 CAPLUS

DN 138:245150

ED Entered STN: 02 Dec 2002

TI Oxidized GaAs/AlAs **mirror** with a quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser

AU Ripin, D. J.; Gopinath, J. T.; Shen, H. M.; Erchak, A. A.; Petrich, G. S.; Kolodziejski, L. A.; Kartner, F. X.; Ippen, E. P.

CS Department of Physics, Massachusetts Institute of Technology, Cambridge, MA, 02139, USA

SO Optics Communications (2002), 214(1-6), 285-289
CODEN: OPCOB8; ISSN: 0030-4018

PB Elsevier Science B.V.

DT Journal

LA English

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76

AB Ultra-broadband saturable Bragg reflectors (SBR) consisting of a 7-period GaAs/AlxOy Bragg **mirror** and an InGaAs/InP quantum well were studied and used to start modelocking of 36 fs pulses near 1500 nm in a dispersion compensated Cr4+:YAG laser. The **mirrors** are comprised of **high-index-contrast** GaAs/AlxOy Bragg stacks grown as GaAs/AlAs and oxidized to create **mirror** areas as wide as 300 μm. They exhibit non-saturable losses < 0.8% and a stopband from 1300 to 1800 nm, indicating the potential for the generation of shorter pulses.

ST oxidized aluminum gallium arsenide saturable Bragg reflector ultrashort

pulse; chromium YAG laser oxidized gallium arsenide aluminum **mirror**

IT Wet oxidation
(effect of; oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT IR reflectance spectra
(near-IR, of SBR; oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT IR laser radiation
IR lasers
Solid state lasers
(near-IR; oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT Interfacial structure
Refractive index
(of SBR; oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT Laser **mirrors**
Quantum well devices
Saturable absorbers
(oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT Laser radiation
(pulsed; oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT Bragg reflectors
(saturable; oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT 7440-47-3, Chromium, uses 15723-28-1, Chromium(4+), uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(YAG doped with; oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT 12005-21-9, YAG
RL: DEV (Device component use); USES (Uses)
(chromium-doped; oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT 22398-80-7, Indium phosphide (InP), uses
RL: DEV (Device component use); USES (Uses)
(cladding; oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT 1344-28-1DP, Aluminum oxide, nonstoichiometric
RL: DEV (Device component use); PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation); USES (Uses)
(oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT 1303-00-0, Gallium arsenide (GaAs), properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT 22831-42-1, Aluminum arsenide (AlAs)
RL: DEV (Device component use); RCT (Reactant); RACT (Reactant or

reagent); USES (Uses)
(oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

IT 106070-25-1, Gallium indium arsenide
RL: DEV (Device component use); USES (Uses)
(quantum well; oxidized GaAs/AlAs **mirror** with quantum-well saturable absorber for ultrashort-pulse Cr4+:YAG laser)

RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Chang, Y; Appl Phys Lett 1998, V73, P2098 CAPLUS
(2) Choquette, K; IEEE J Select Top Quant Electron 1997, V3, P916 CAPLUS
(3) Collings, B; Opt Lett 1996, V21, P1171 CAPLUS
(4) Gopinath, J; Appl Phys Lett 2001, V78, P3409 CAPLUS
(5) Hayduk, M; Opt Commun 1997, V137, P55 CAPLUS
(6) Keller, U; IEEE J Select Top Quant Electron 1996, V2, P435 CAPLUS
(7) Reid, D; Opt Photon News 1998, V19
(8) Ripin, D; Opt Lett 2002, V27, P61 CAPLUS
(9) Schon, S; Proceedings of CLEO 2001, paper CWB2, P314
(10) Spalter, S; Appl Phys B 1997, V65, P335
(11) Thoen, E; Appl Phys Lett 1999, V74, P3927 CAPLUS
(12) Tong, Y; Opt Commun 1997, V136, P235 CAPLUS
(13) Tsuda, S; IEEE J Select Top Quant Electron 1996, V2, P454 CAPLUS
(14) Zhang, Z; Appl Phys B 2000, V70, PS59 CAPLUS
(15) Zhang, Z; Opt Lett 1999, V24, P1768 CAPLUS

L78 ANSWER 8 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2002:572177 CAPLUS

DN 137:269947

ED Entered STN: 02 Aug 2002

TI Light-current characterization of dual-**wavelength** VCSELs

AU Badilita, Vlad; Carlin, Jean-Francois; Brunner, Marcel; Ilegems, Marc

CS Inst. Quantum Electron. Photon., Swiss Federal Institute of Technology, Lausanne, CH-1015, Switz.

SO Proceedings of SPIE-The International Society for Optical Engineering (2002), 4649(Vertical-Cavity Surface-Emitting Lasers VI), 87-95
CODEN: PSISDG; ISSN: 0277-786X

PB SPIE-The International Society for Optical Engineering

DT Journal

LA English

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76

AB The purpose of this paper is to present a detailed characterization of a dual-**wavelength** VCSEL - the BiVCSEL. This device consists of two active **optical** cavities, which share a coupling **mirror** and can be independently elec. pumped. We present the output powers for the two emitted **wavelengths** (short-. **lambda.**S, long-λ L) vs. the currents in the two cavities (Itop, Ibot). These (λ S, **.lambda** .L)-(Itop, Ibot) maps identify the different regimes of operation of the BiVCSEL: emission at only 1 **wavelength** (either short or long) and dual-**wavelength** emission, each domain being delimitated by

the threshold curves. These curves are passing through a single point, which identify the dual-emission threshold (Ithtop, Ithbot). The apparition of a parasitic lasing mode due to the oxide apertures will be also presented as well as the competition between this mode and the designed lasing modes of the structure.

ST dual **wavelength** VCSEL IR laser radiation current; vertical cavity surface emitting laser IR dual **wavelength**

IT Semiconductor lasers
(IR, near-IR; light-current characterization of dual-**wavelength** VCSELs)

IT Oxides (inorganic), properties
RL: **DEV (Device component use)**; PRP (Properties); USES (Uses)
(aperture; light-current characterization of dual-**wavelength** VCSELs including parasitic mode due to)

IT Cavity resonators
(independent vs. combined operation of 2; light-current characterization of dual-**wavelength** VCSELs)

IT Electric current
(light-current characterization of dual-**wavelength** VCSELs)

IT IR lasers
(near-IR, dual-**wavelength** VCSEL; light-current characterization of dual-**wavelength** VCSELs)

IT IR laser radiation
(near-IR, lasing as function of injection current; light-current characterization of dual-**wavelength** VCSELs)

IT IR lasers
(semiconductor, near-IR; light-current characterization of dual-**wavelength** VCSELs)

IT 7440-21-3, Silicon, uses 7440-44-0, Carbon, uses
RL: **DEV (Device component use)**; MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(dopant; light-current characterization of dual-**wavelength** VCSELs)

IT 22831-42-1, Aluminum arsenide (AlAs)
RL: **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(**low index layer** in multilayer **mirror**; light-current characterization of dual-**wavelength** VCSELs)

IT 1303-00-0, Gallium arsenide, uses 107121-46-0, Aluminum gallium arsenide (Al0.9Ga0.1As)
RL: **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(multilayer **mirror**; light-current characterization of dual-**wavelength** VCSELs)

IT 106070-25-1, Gallium indium arsenide
RL: **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(quantum well; light-current characterization of dual-**wavelength** VCSELs)

IT 7440-57-5, Gold, uses

RL: **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(reflective layer; light-current characterization of dual-**wavelength** VCSELs)

RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Brunner, M; IEEE Photonics Technol Lett 2000, V12, P1316
(2) Carlin, J; Appl Phys Lett 1999, V75, P908 CAPLUS
(3) Choquette, K; Appl Phys Lett 1995, V66, P3413 CAPLUS
(4) Kawaguchi, H; IEE Proc J Optoelectron 1993, V140, P3
(5) Larson, M; Appl Phys Lett 1996, V68, P891 CAPLUS
(6) Lim, S; 15th IEEE International Semiconductor Laser Conference 1996, P183
(7) Lott, J; 15th IEEE International Semiconductor Laser Conference 1996, P185
(8) Noble, M; IEEE Photonics Technol Lett 1998, V10, P475
(9) Pellandini, P; Appl Phys Lett 1997, V71, P864 CAPLUS
(10) Tilford, C; Appl Opt 1997, V16, P1857
(11) Wang, C; Opt Lett 1995, V20, P1292
(12) Wipiejewski, T; IEEE Photonics Technol Lett 1993, V5, P889

L78 ANSWER 9 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN

AN 2001:62468 CAPLUS

DN 134:123372

ED Entered STN: 26 Jan 2001

TI Saturable Bragg reflectors and their use in mode-locked lasers

IN Cunningham, John E.; Knox, Wayne H.

PA Lucent Technologies Inc., USA

SO Eur. Pat. Appl., 7 pp.
CODEN: EPXXDW

DT Patent

LA English

IC ICM H01S003-098
ICS G02F001-35

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1071179	A2	20010124	EP 2000-305863	20000711
	EP 1071179	A3	20020724		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	US 6259719	B1	20010710	US 1999-358112	19990721
	JP 2001068771	A2	20010316	JP 2000-220482	20000721
PRAI	US 1999-358112	A	19990721		

AB Saturable Bragg reflectors for use in mode locking a laser which comprises a semiconductor multilayer stack with alternating high and low refractive **index** quarterwave thick **layers** are described in which at least the top two layers of the stack have an **optical** thickness of approx. one eighth of the operating **wavelength** and a quantum well of absorber material is located near the center of each of the **layers** of **high index** of refraction materials that are sandwiched between the pair of one eighth **wavelength**

layers. Mode-locked lasers using the reflectors are also described.
ST mode locked laser **mirror** saturable Bragg reflector quantum well; saturable Bragg reflector quantum well layer
IT Laser **mirrors**
(Bragg-reflector; saturable Bragg reflectors and their use in mode-locked lasers as)
IT Solid state lasers
(**mirrors** for mode-locked; saturable Bragg reflectors and their use in mode-locked lasers)
IT Bragg reflectors
Quantum well devices
(saturable Bragg reflectors and their use in mode-locked lasers)
IT Saturable absorbers
(semiconductive; saturable Bragg reflectors and their use in mode-locked lasers)
IT 1303-00-0, Gallium arsenide, uses 37382-15-3, Aluminum gallium arsenide ((Al,Ga)As)
RL: **DEV (Device component use)**; USES (Uses)
(high refractive **index layer**; saturable Bragg reflectors with quantum well layers and their use in mode-locked lasers)
IT 22831-42-1, Aluminum arsenide
RL: **DEV (Device component use)**; USES (Uses)
(low refractive **index layer**; saturable Bragg reflectors with quantum well layers and their use in mode-locked lasers)
IT 107498-91-9, Gallium indium arsenide Ga0.7In0.3As
RL: **DEV (Device component use)**; USES (Uses)
(quantum well layer; saturable Bragg reflectors and their use in mode-locked lasers)

L78 ANSWER 10 OF 25 INSPEC (C) 2004 IEE on STN
AN 2002:7185581 INSPEC DN B2002-03-2550G-098
TI An infinitely selective repair buffer for EUVL reticles.
AU Wasson, J.; Smith, K.; Mangat, P.J.S.; Hector, S. (Adv. Process Dev. & External Res., Motorola Inc., Tempe, AZ, USA)
SO Proceedings of the SPIE - The International Society for Optical Engineering (2001) vol.4343, p.402-8. 7 refs.
Published by: SPIE-Int. Soc. Opt. Eng
Price: CCCC 0277-786X/01/$15.00
CODEN: PSISDG ISSN: 0277-786X
SICI: 0277-786X(2001)4343L.402:ISRB;1-F
Conference: Emerging Lithographic Technologies V. Santa Clara, CA, USA, 27 Feb-1 March 2001
Sponsor(s): SPIE
DT Conference Article; Journal
TC Practical; Experimental
CY United States
LA English
AB The three-layer absorber stack for EUVL reticles currently consists of an absorber, repair buffer and etch stop layers. The repair buffer should exhibit high etch selectivity during the absorber etch processes (i.e.

pattern transfer and focused ion beam (FIB) repair), be thermally and electrically **conductive**, optimally thin and have high etch selectivity to the silicon-capping layer over the Mo/Si **multi-layer mirror.** The absorber materials that have been studied in the past are TaSiN and Cr with SiON as the repair buffer on top of a Cr etch stop layer. The SiON repair buffer is insulating, exhibiting low thermal and electrical **conductivity.** Also, the required thickness for FIB repair is greater than 750 AA using a standard 30-keV Ga+ FIB tool, while the etch selectivity to the silicon capping layer during pattern transfer is less than five to one necessitating a Cr etch stop. A sputtered carbon repair buffer exhibiting the required qualities has been studied. The carbon film is thermally and electrically **conductive** and exhibits extremely high reactive ion etch selectivity to the silicon-capping layer. Carbon also has the lowest sputter yield out of all the elements opening a larger FIB repair process window without using gas-assisted etching. A **conductive** repair buffer also prevents the possibility of static charge buildup on the mask that could damage patterns during an electrostatic discharge.

CC B2550G Lithography (semiconductor technology)

CT CARBON; FOCUSED ION BEAM TECHNOLOGY; SPUTTERING; ULTRAVIOLET LITHOGRAPHY

ST three-layer absorber stack; EUVL reticles; absorber layer; high etch selectivity; absorber etch processes; pattern transfer; focused ion beam repair; silicon-capping layer; FIB repair; etch selectivity; sputtered carbon repair buffer; sputter yield; **conductive repair buffer**; static charge buildup; electrostatic discharge; extreme ultra-violet lithography; Mo/Si multilayer mirror; repair buffer layer; etch stop layer; 30 keV; C; Si; SiON; Mo-Si

CHI C int, C el; Si int, Si el; SiON int, Si int, N int, O int, SiON ss, Si ss, N ss, O ss; Mo-Si int, Mo int, Si int, Mo el, Si el

PHP electron volt energy 3.0E+04 eV

ET Mo; N*Si*Ta; N sy 3; sy 3; Si sy 3; Ta sy 3; TaSiN; Ta cp; cp; Si cp; N cp; Cr; N*O*Si; SiON; O cp; Ga; Ga+; Ga ip 1; ip 1; C; Si; Mo*Si; Mo sy 2; sy 2; Si sy 2; Mo-Si; O

L78 ANSWER 11 OF 25 CAPLUS

AN 2000:409455 CAPLUS

DN 133:112010

ED Entered STN: 21 Jun 2000

TI IV-VI compound mid-infrared high-reflectivity **mirrors** and vertical-cavity surface-emitting lasers grown by molecular-beam epitaxy

AU Shi, Z.; Xu, G.; McCann, P. J.; Fang, X. M.; Dai, N.; Felix, C. L.; Bewley, W. W.; Vurgaftman, I.; Meyer, J. R.

CS Laboratory for Electronic Properties of Materials, School of Electrical and Computer Engineering, University of Oklahoma, Norman, OK, 73019, USA

SO Applied Physics Letters (2000), 76(25), 3688-3690
CODEN: APPLAB; ISSN: 0003-6951

PB American Institute of Physics

DT Journal

LA English

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

AB Mid-IR broadband high-reflectivity Pb1-xSrxSe/BaF2 distributed Bragg

reflectors and vertical-cavity surface-emitting lasers (VCSELs) with PbSe as the active material were grown by MBE. Because of an extremely **high index contrast**, **mirrors** with only three quarter-wave layer pairs had reflectivities exceeding 99%. For pulsed optical pumping, a lead salt VCSEL emitting at the cavity wavelength of 4.5-4.6 μm operated nearly to room temperature (289 K).

ST lead strontium selenide **mirror** vertical laser

IT Distributed Bragg reflectors
Laser **mirrors**
Molecular beam epitaxy
Optical pumping
Optical reflection
Semiconductor lasers
(IV-VI compound mid-IR high-reflectivity **mirrors** and vertical-cavity surface-emitting lasers grown by mol.-beam epitaxy)

IT 7787-32-8, Barium fluoride (BaF2) 12069-00-0, Lead selenide (PbSe) 112436-38-1, Europium lead telluride (Eu0.01Pb0.99Te) 115968-08-6, Europium lead telluride (Eu0.06Pb0.94Te) 119173-40-9, Lead strontium selenide ((Pb,Sr)Se) 156903-52-5, Lead strontium selenide (Pb0.85Sr0.15Se) 282734-50-3, Lead strontium selenide (Pb0.97Sr0.03Se)
RL: DEV (Device component use); USES (Uses)
(IV-VI compound mid-IR high-reflectivity **mirrors** and vertical-cavity surface-emitting lasers grown by mol.-beam epitaxy)

RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Bauer, G; J Nonlinear Opt Phys Mater 1995, V4, P283 CAPLUS
(2) Bewley, W; Appl Phys Lett 1999, V74, P1075 CAPLUS
(3) Faist, J; Appl Phys Lett 1996, V68, P3680 CAPLUS
(4) Feit, Z; Appl Phys Lett 1996, V68, P738 CAPLUS
(5) Felix, C; Appl Phys Lett 1997, V71, P3483 CAPLUS
(6) Findlay, P; Phys Rev B 1998, V58, P12908 CAPLUS
(7) Klann, R; J Appl Phys 1995, V77, P277 CAPLUS
(8) Lambrecht, A; J Cryst Growth 1991, V108, P310
(9) Lee, H; Electron Lett 1999, V35, P1743 CAPLUS
(10) Meyer, J; Appl Phys Lett 1998, V73, P2857 CAPLUS
(11) Roux, C; Appl Phys Lett 1999, V75, P3763 CAPLUS
(12) Schliessl, U; Infrared Phys Technol 1999, V40, P325
(13) Schwarzl, T; IEEE J Quantum Electron 1999, V35, P1753 CAPLUS
(14) Shi, Z; Appl Phys Lett 1995, V66, P2573
(15) Slivken, S; Appl Phys Lett 1999, V74, P2758 CAPLUS
(16) Springholz, G; Thin Films: Heteroepitaxial: Systems 1999
(17) Tacke, M; Infrared Phys Technol 1995, V36, P447 CAPLUS
(18) Yang, R; Electron Lett 1999, V35, P1254

L78 ANSWER 12 OF 25 INSPEC (C) 2004 IEE on STN
AN 2001:6833742 INSPEC DN B2001-03-2550G-119
TI EUV mask fabrication using Be-based multilayer mirrors.
AU Mangat, P.J.; Wasson, J.R.; Hector, S.D. (Adv. Products R&D Lab., Motorola Inc., Austin, TX, USA); Cardinale, G.F.; Bajt, S.
SO Proceedings of the SPIE - The International Society for Optical Engineering (2000) vol.3997, p.814-18. 16 refs.
Published by: SPIE-Int. Soc. Opt. Eng

Price: CCCC 0277-786X/2000/$15.00
CODEN: PSISDG ISSN: 0277-786X
SICI: 0277-786X(2000)3997L.814:MFUB;1-6
Conference: Emerging Lithographic Technologies IV. Santa Clara, CA, USA, 28 Feb-1 March 2000
Sponsor(s): SPIE
DT Conference Article; Journal
TC Experimental
CY United States
LA English

AB Extreme Ultra-Violet lithography is one of the leading next generation lithography options. Currently, EUV masks are routinely made of reflective mirrors made of Mo/Si multi-layers, which have a peak reflectivity of 67.5% at a wavelength of 13.4 nm. However, in order to increase the throughput of an EUVL system, a new set of Be-based multi-layers are being developed, which have a peak reflectivity of near 70% at 11.4. The two materials that have recently been developed are Mo/Be and MoRu/Be multi-layers. Beryllium based multi-layer masks show great promise for a significant increase in the lithography system throughput (2-3X over the current Mo/Si multi-layer mask) due to their increased reflectivity and bandwidth at 11.4 nm where the xenon laser plasma source is more intense. We have successfully developed a process to fabricate masks using Be-based multi-layers. The absorber stack consists of TaSiN (absorber), SiON (repair buffer) and Cr (**conductive** etch stop) deposited on the **multi-layer mirror.** Lawrence Livermore National Laboratory supplied the Mo/Be and MoRu/Be **multi-layer mirrors** used to fabricate the masks. Completed masks were exposed at Sandia National Laboratories' 10X EUV exposure system and equal lines and spaces down to 80 nm were successfully printed. The paper addresses the issues and challenges to fabricate the mask using Be-based multi-layers and a comparison will be made with the Mo/Si multi-layer mask patterning process.

CC B2550G Lithography (semiconductor technology); B4190F Optical coatings and filters

CT BERYLLIUM; MASKS; MIRRORS; MOLYBDENUM; MOLYBDENUM ALLOYS; OPTICAL MULTILAYERS; REFLECTIVITY; RUTHENIUM ALLOYS; ULTRAVIOLET LITHOGRAPHY

ST mask fabrication; multilayer mirror; extreme ultraviolet lithography; next generation lithography; reflectivity; throughput; absorber stack; 11.4 nm; 80 nm; Mo-Be; MoRu-Be

CHI Mo-Be int, Be int, Mo int, Be el, Mo el; MoRu-Be int, MoRu int, Be int, Mo int, Ru int, MoRu bin, Mo bin, Ru bin, Be el

PHP wavelength 1.14E-08 m; size 8.0E-08 m

ET Be; Mo; Mo*Ru; Mo sy 2; sy 2; Ru sy 2; MoRu; Mo cp; cp; Ru cp; N*Si*Ta; N sy 3; sy 3; Si sy 3; Ta sy 3; TaSiN; Ta cp; Si cp; N cp; N*O*Si; SiON; O cp; Cr; Be*Mo; Be sy 2; Mo-Be; Be*Mo*Ru; Be sy 3; Mo sy 3; Ru sy 3; MoRu-Be; Ru

L78 ANSWER 13 OF 25 JAPIO (C) 2004 JPO on STN

AN 1999-326632 JAPIO

TI OPTICAL **WAVELENGTH** SELECTION ELEMENT, AND MANUFACTURE OF **OPTICAL DEVICE** AND ELEMENT USING THE SAME

IN UEHARA NOBORU

PA JAPAN AVIATION ELECTRONICS IND LTD
PI JP 11326632 A 19991126 Heisei
AI JP 1998-132910 (JP10132910 Heisei) 19980515
PRAI JP 1998-132910 19980515
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1999
IC ICM G02B005-28
ICS C23C014-08; C23C014-30; C23C014-32; C23C014-35; C23C014-46; H01S003-1055; H01S003-16
AB PROBLEM TO BE SOLVED: To prevent the deterioration in efficiency without the occurrence of fresh loss in a laser resonator by imparting a gradient to the thickness of dielectric thin films extending from one end edge toward the other end edge of a substrate surface.
SOLUTION: This optical **wavelength** selection element has multilayered dielectric thin films, alternately laminated with dielectric thin films 25, 26 which vary in the refractive **index** in **multiple layers. Wavelength** selectability is imparted to the high reflection **mirror** itself constituting the laser resonator. The surface of optical glass, which is a substrate 27 is subjected to thin film design, indicating a high narrow-band light reflection characteristic, only near the certain **wavelength** by adopting an ion beam sputtering method and atomic beam sputtering method which are multilayered thin-film deposition methods of high accuracy and high stability for imparting gradient to the thickness of the dielectric thin films 25, 26 extending from the one end edge toward the other end edge of the gradient substrate surface at depositing. The optical **wavelength** selection element changed in the central **wavelength** at which the reflectivity is maximized by the position of the substrate 27 is thus constituted. The proportional shifting of the light **wavelength** to a long **wavelength** side by an increase in the film thickness is utilized.
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L78 ANSWER 14 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
AN 1999:576349 CAPLUS
DN 131:278808
ED Entered STN: 14 Sep 1999
TI Room-temperature optically pumped CdHgTe vertical-cavity surface-emitting laser for the 1.5 μm range
AU Roux, C.; Hadji, E.; Pautrat, J.-L.
CS Departement de Recherche Fondamentale sur la Matiere Condensee, CEA-Grenoble, Grenoble, 38054, Fr.
SO Applied Physics Letters (1999), 75(12), 1661-1663
CODEN: APPLAB; ISSN: 0003-6951
PB American Institute of Physics
DT Journal
LA English
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
AB The demonstration of a room-temperature CdHgTe surface-emitting laser is reported. A planar heterostructure with two **high-index contrast** dielec. **mirrors** deposited after growth and

after etching off the substrate was realized. The emission wavelength of 1.57 μm is nearly independent of temperature ($d\lambda/dT = 0.02$ nm/K) and the multimode linewidth is 10 meV. The pulsed threshold power is ≥21 mW for a 300 μm spot. Lasing is observed up to 300 K and the peak output power exceeds 700 mW.

ST cadmium mercury telluride vertical cavity surface emitting laser

IT Molecular beam epitaxy
Optical pumping
Quantum well devices
Semiconductor lasers
(cadmium mercury telluride optically pumped vertical-cavity surface-emitting laser)

IT IR lasers
(near-IR; cadmium mercury telluride optically pumped vertical-cavity surface-emitting laser)

IT IR luminescence
(near-IR; of cadmium mercury telluride vertical cavity laser structure)

IT Bragg reflectors
Laser **mirrors**
(zinc sulfide/yttrium fluoride reflector for cadmium mercury telluride near-IR laser)

IT 1314-98-3, Zinc sulfide (ZnS), properties 13709-49-4, Yttrium fluoride (YF3)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(Bragg reflector; cadmium mercury telluride optically pumped vertical-cavity surface-emitting laser)

IT 1306-25-8, Cadmium telluride (CdTe), properties 109225-10-7, Cadmium mercury telluride (Cd0.75Hg0.25Te)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(barrier; cadmium mercury telluride optically pumped vertical-cavity surface-emitting laser)

IT 7631-86-9, Silica, uses
RL: DEV (Device component use); USES (Uses)
(cadmium mercury telluride optically pumped vertical-cavity surface-emitting laser structure glued onto Suprasil quartz)

IT 106390-41-4, Cadmium zinc telluride (Cd0.96Zn0.04Te)
RL: NUU (Other use, unclassified); USES (Uses)
(cadmium mercury telluride vertical-cavity surface-emitting laser structure grown on CdZnTe substrate, later removed)

IT 12068-90-5, Mercury telluride (HgTe)
RL: DEV (Device component use); USES (Uses)
(etch stop layer; cadmium mercury telluride optically pumped vertical-cavity surface-emitting laser)

IT 114965-67-2, Cadmium mercury telluride (Cd0.59Hg0.41Te)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(quantum wells; optically pumped vertical-cavity surface-emitting laser)

RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Babic, D; Electron Lett 1994, V30, P704 CAPLUS
(2) Blum, O; Electron Lett 1997, V33, P1878 CAPLUS
(3) Bouche, N; Appl Phys Lett 1998, V73, P2718 CAPLUS

(4) Deng, H; Appl Phys Lett 1995, V67, P3526 CAPLUS
(5) Hadji, E; Appl Phys Lett 1995, V67, P2591 CAPLUS
(6) Hadji, E; Appl Phys Lett 1996, V68, P2480 CAPLUS
(7) Huffaker, D; Appl Phys Lett 1997, V70, P1781 CAPLUS
(8) Koeth, J; Appl Phys Lett 1998, V72, P1638 CAPLUS
(9) Konig, H; Appl Phys Lett 1998, V73, P2703 CAPLUS
(10) Piprek, J; Appl Phys Lett 1998, V72, P1814 CAPLUS
(11) Streubel, K; IEEE Photonics Technol Lett 1996, V8, P1121
(12) Tai, K; Appl Phys Lett 1993, V63, P2624 CAPLUS
(13) Yamamoto, Y; Int J Mod Phys B 1993, V7, P1653 CAPLUS
(14) Yokoyama, H; Confined Electrons and Photons New Physics and Application, Nato ASI Series B 340 1995, P427 CAPLUS

L78 ANSWER 15 OF 25 CAPLUS
AN 1999:263251 CAPLUS
DN 130:359084
ED Entered STN: 29 Apr 1999
TI AlAsSb-based distributed Bragg reflectors using InAlGaAs as **high -index layer**
AU Hall, E.; Kroemer, H.; Coldren, L. A.
CS Materials Department, University of California, Santa Barbara, Santa Barbara, CA, 93106, USA
SO Electronics Letters (1999), 35(5), 425-427
CODEN: ELLEAK; ISSN: 0013-5194
PB Institution of Electrical Engineers
DT Journal
LA English
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
AB The **optical** and elec. properties of InAlGaAs/AlAsSb distributed Bragg reflectors for long-**wavelength** vertical-cavity surface-emitting lasers are reported. This materials combination showed much lower resistances for p-type **mirrors** compared to AlGaAsSb/AlAsSb **mirrors**, resulting from a smaller valence band discontinuity.
ST antimonide arsenide distributed Bragg reflector; aluminum arsenide antimonide aluminum gallium indium arsenide reflector
IT Distributed Bragg reflectors
Laser **mirrors**
(aluminum arsenide antimonide-based distributed Bragg reflectors using aluminum gallium indium arsenide **high-index layers**)
IT 106070-22-8, Aluminum gallium indium arsenide ((Al,Ga,In)As)
200119-23-9, Aluminum arsenide antimonide
RL: **DEV (Device component use)**; USES (Uses)
(aluminum arsenide antimonide-based distributed Bragg reflectors using aluminum gallium indium arsenide **high-index layers**)
RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Babic, D; IEEE J Quantum Electron 1997, V33, P1369 CAPLUS

(2) Blum, O; Appl Phys Lett 1995, V67, P3233 CAPLUS
(3) Blum, O; Appl Phys Lett 1995, V66, P329 CAPLUS
(4) Blum, O; Electron Lett 1997, V33, P1878 CAPLUS
(5) Hall, E; submitted to J Cryst Growth
(6) Mondry, M; IEEE Photonics Technol Lett 1992, V4, P627
(7) Ungaro, G; Electron Lett 1998, V34, P402

L78 ANSWER 16 OF 25 CAPLUS
AN 1999:90173 CAPLUS
DN 130:215663
ED Entered STN: 12 Feb 1999
TI Analytical design of double-chirped **mirrors** with custom-tailored dispersion characteristics
AU Matuschek, Nicolai; Kartner, Franz X.; Keller, Ursula
CS Institute of Quantum Electronics, Ultrafast Laser Physics Laboratory, Swiss Federal Institute of Technology, Zurich, CH-8093, Switz.
SO IEEE Journal of Quantum Electronics (1999), 35(2), 129-137
CODEN: IEJQA7; ISSN: 0018-9197
PB Institute of Electrical and Electronics Engineers
DT Journal
LA English
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
AB The authors present a theory for the anal. design of double-chirped **mirrors** with special dispersion characteristics. A simple anal. **equation** takes an arbitrarily desired group delay dispersion (that also includes possible higher order dispersion) as an input function and gives the chirp law as an output. The chirp law dets. the local Bragg **wavelengths** in the **mirror.** It allows the calcn. of the thicknesses of the high- and **low-index layers** if the double chirp of the layers in the front part of the **mirror** is taken into account. The authors use this method to design a highly dispersive double-chirped semiconductor Bragg **mirror** and a double-chirped TiO2-SiO2 **mirror** for higher order dispersion compensation in **optical** parametric oscillators operating in the visible spectral range. The design formulas are applicable to general chirped Bragg gratings and provide insight into the reasons why certain dispersion characteristics might be impossible to achieve.
ST chirped **mirror** coatings dielec films ultrafast optics; coupled mode analysis
IT Diffraction gratings
(Bragg; anal. design of double-chirped **mirrors** with custom-tailored dispersion characteristics)
IT Reflection spectra
Reflection spectra
(UV-visible; anal. design of double-chirped **mirrors** with custom-tailored dispersion characteristics)
IT **Optical** parametric oscillators
(anal. design of double-chirped **mirrors** with custom-tailored dispersion characteristics)
IT Electric insulators

(coatings; anal. design of double-chirped **mirrors** with
custom-tailored dispersion characteristics)
IT **Mirrors**
(double-chirped; anal. design of double-chirped **mirrors** with
custom-tailored dispersion characteristics)
IT Semiconductor devices
(**mirror**; anal. design of double-chirped **mirrors**
with custom-tailored dispersion characteristics)
IT IR reflectance spectra
(near-IR; anal. design of double-chirped **mirrors** with
custom-tailored dispersion characteristics)
IT Refractive index
(profile; anal. design of double-chirped **mirrors** with
custom-tailored dispersion characteristics)
IT UV and visible spectra
UV and visible spectra
(reflection; anal. design of double-chirped **mirrors** with
custom-tailored dispersion characteristics)
IT 13463-67-7, Titanium oxide (TiO2), properties
RL: **DEV (Device component use)**; PRP (Properties); USES (Uses)
(anal. design of double-chirped **mirrors** with custom-tailored
dispersion characteristics)
IT 7631-86-9, Silicon dioxide, uses
RL: NUU (Other use, unclassified); USES (Uses)
(substrate; anal. design of double-chirped **mirrors** with
custom-tailored dispersion characteristics)
RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; private communication from G M Gale 1998
(2) Cerullo, G; Appl Phys Lett 1997, V71, P3616 CAPLUS
(3) Dobrowolski, J; Appl Opt 1996, V35, P644 CAPLUS
(4) Gale, G; IEEE J Select Topics Quantum Electron 1998, V4, P224 CAPLUS
(5) Gale, G; J Opt Soc Amer B 1998, V15, P702 CAPLUS
(6) Haus, H; Waves and Fields in Optoelectronics 1998
(7) Jung, I; Opt Lett 1997, V22, P1009 CAPLUS
(8) Kartner, F; Opt Lett 1997, V22, P831 CAPLUS
(9) Matuschek, N; IEEE J Quantum Electron 1997, V33, P295 CAPLUS
(10) Matuschek, N; IEEE J Select Topics Quantum Electron 1998, V4, P197 CAPLUS
(11) Matuschek, N; Proc Conf Lasers and Electrooptics (CLEO '98) 1998
(12) Poladian, L; Phys Rev E 1993, V48, P4758 CAPLUS
(13) Press, W; Numerical Recipes in Fortran 2nd ed 1994
(14) Shirakawa, A; Proc Conf Lasers and Electrooptics (CLEO '98) 1998
(15) Sipe, J; J Opt Soc Amer A 1994, V11, P1307
(16) Stingl, A; Opt Lett 1995, V20, P602
(17) Sutter, D; IEEE J Select Topics Quantum Electron 1998, V4, P169 CAPLUS
(18) Szipocs, R; Opt Lett 1994, V19, P201 CAPLUS
(19) Tikhonravov, A; Appl Opt 1997, V36, P4382
(20) Zhou, J; Opt Lett 1994, V19, P1149 CAPLUS

L78 ANSWER 17 OF 25 CAPLUS
AN 1998:706006 CAPLUS
DN 129:308401

ED Entered STN: 06 Nov 1998
TI Reflectors
IN Bischer, Carmen B., Jr.; Small, Edward A., Jr.
PA Dielectric Coating Industries, USA
SO U.S., 7 pp., Cont.-in-part of U.S. Ser. No. 344,159, abandoned.
CODEN: USXXAM
DT Patent
LA English
IC ICM G02B001-10
NCL 359584000
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
FAN.CNT 4

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5828493	A	19981027	US 1996-710464	19960917
	US 5395662	A	19950307	US 1993-58642	19930505
	US 6005715	A	19991221	US 1998-79211	19980514
PRAI	US 1992-919768	A2	19920724		
	US 1993-58642	A3	19930505		
	US 1994-344159	B2	19941123		
	US 1996-710464	A2	19960917		

AB High reflectance reflectors comprise: a base of polished metal (e.g., unanodized aluminum); a nonporous layer of oxide at least 0.5 μm thick deposited over the base; an opaque layer of aluminum vacuum deposited onto the layer of oxide; a quarter **wavelength** thick **layer** of a **low index** of refraction material and a quarter **wavelength** thick **layer** of a **high index** of refraction material vacuum deposited onto the layer of aluminum. Reflectors are also described which are formed by vacuum depositing onto a smooth base a nonporous layer of oxide to a thickness of at least 0.5 μm; vacuum depositing over the nonporous layer of oxide an opaque layer of aluminum; and vacuum depositing over the layer of aluminum, quarter **wavelength** reflectance-enhancing layers.
ST aluminum reflector laminate
IT **Mirrors**
Optical reflectors
(reflectors using aluminum layers in laminated structures)
IT 7429-90-5, Aluminum, uses 7631-86-9, Silica, uses
RL: **DEV (Device component use)**; USES (Uses)
(reflectors using aluminum layers in laminated structures)
RE.CNT 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Alexander; US 2812270 1957 CAPLUS
(2) Ando; US 5110637 1992 CAPLUS
(3) Anon; JP 61233701 1986
(4) Baer; US 2952569 1960
(5) Baker; US 4475794 1984 CAPLUS
(6) Berneron; US 5062900 1991 CAPLUS
(7) Cariou; US 4961994 1990 CAPLUS
(8) de Vrieze; US 5068568 1991 CAPLUS
(9) Dickey; US 5372874 1994 CAPLUS

(10) Fujii; US 5216551 1993
(11) Fujii; US 5583704 1996 CAPLUS
(12) Gillich; US 5760981 1998 CAPLUS
(13) Grewal; US 4482209 1984
(14) Grossman; US 3951526 1976
(15) Halper; US 4379196 1983 CAPLUS
(16) Hoffman; US 4737252 1988 CAPLUS
(17) Ichikawa; US 4944581 1990
(18) Kohara; US 5063096 1991
(19) Mason; US 2108604 1938
(20) Nakajima; US 5007710 1991
(21) Peters; US 4371587 1983 CAPLUS
(22) Philips; US 5084351 1992 CAPLUS
(23) Rancourt; US 4735488 1988
(24) Tsai; US 5437931 1995 CAPLUS
(25) Turner; US 2519722 1950 CAPLUS
(26) Zultzke; US 4868004 1989 CAPLUS

L78 ANSWER 18 OF 25 CAPLUS
AN 1998:781919 CAPLUS
DN 130:131501
ED Entered STN: 14 Dec 1998
TI Laser strength **mirrors** for high-power NIR-region solid-state lasers
AU Novopashin, Vladimir V.; Levchuk, Elena A.; Shestakov, Alexsandr V.
CS Polyus Research & Development Institute, Moscow, 117342, Russia
SO Proceedings of SPIE-The International Society for Optical Engineering (1998), 3413(Materials Modification by Ion Irradiation), 252-261
CODEN: PSISDG; ISSN: 0277-786X
PB SPIE-The International Society for Optical Engineering
DT Journal
LA English
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
AB Some aspects of obtaining high reflective (HR) dielec. **mirrors** with high damage threshold (LDT) for high-power solid-state near IR region (NIR) lasers are considered. **Optical** properties of these **mirrors** were studied as properties of each alternate **layer** evaporated with **high-index** (H) or **low-index** (L) materials as multilayer system that depends on **mirror** construction, parameters of evaporation, ion-beam influence, substrate materials and quality of substrate surface. Refractory oxides ZrO_2, HfO_2, Ta_2O_5, Al_2O_3 and SiO_2 were used as starting materials for evaporation Ion-beam influence was estimated as changing of **optical** absorptance at a λ = 1.064 μm by laser modulated photothermal radiometry (LMPTR). The quality of various work-up substrate surface was controlled by this method. Substrates with different surface roughness (σ, root-mean-square) had different absorption. Band edge of absorption of pure substrates in UV region influenced on laser damage threshold (LDT) of **mirrors**. **Optical** properties of evaporated **mirrors** were tested as the ability of strength for laser irradiation as cavity-**mirrors** of high power lasers. ZrO_2/SiO_2

mirrors had the most high laser strength. Estimated value of laser d. was 3.6 GW/cm2.
ST mirror high power near IR solid state laser
IT **Mirrors**
(for high-power near-IR solid-state lasers)
IT IR lasers
(near-IR, solid-state; laser strength **mirrors** for high-power)
IT Solid state lasers
(near-IR; laser strength **mirrors** for high-power)
IT Absorptivity
Optical modulation
(of high-power near-IR solid-state lasers)
IT 1314-23-4, Zirconium dioxide, uses 1314-61-0, Tantalum pentoxide 1344-28-1, Alumina, uses 7631-86-9, Silica, uses 12055-23-1, Hafnium dioxide
RL: **DEV (Device component use)**; USES (Uses)
(laser strength **mirrors** for high-power NIR-region solid-state lasers containing)
RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

(1) Brauns, B; Russian J Kvantovaja Electronica 1988, V15(10), P2051 CAPLUS
(2) Gibson, U; Physics of Thin Films 1987, V13, P112
(3) Heitman, W; Appl Opt 1971, V10(11), P2414
(4) Kaufman, H; J Vac Thechnol 1987, VA5(4), P2081
(5) Lowdermilk, W; NBS U S Specl Publ 1980, V568, P391 CAPLUS
(6) Martin, P; Division of Appl Opt 1986, P117
(7) Mattox, D; Deposition technjlogies for films and coatings 1984, P63
(8) Milam, D; Appl Opt 1981, V21(20), P3689
(9) Novopashin, V; Laser News 1996, V2, P39
(10) Novopashin, V; Russian J Laser Technique and Optoelectronics 1993, V3-4, P48
(11) Pulker, H; Coating on Glass 1984, P95
(12) Soileau, M; Appl Opt 1981, V20(6), P1030 CAPLUS
(13) Zverev, G; Russian J Kvantovaja Electronica 1977, V4, P413 CAPLUS
(14) Zverev, G; Russian J Kvantovaja Electronica 1987, V5(1), P45

L78 ANSWER 19 OF 25 WPIX
AN 1997-448839 [41] WPIX
CR 1997-448838 [41]; 1997-448840 [41]; 1997-448841 [41]; 1997-479830 [44]; 2000-386469 [33]; 2002-040120 [05]
DNN N1997-373998 DNC C1997-143185
TI Light fixture for use as diffuse polarisers or diffuse **mirrors** - consisting of light source and optical element comprising first phase and second phase discontinuous along at least two of any three mutually perpendicular axes, disposed within first phase.
DC A89 P81 U14
IN ALLEN, R C; NEVITT, T J; WHEATLEY, J A
PA (MINN) MINNESOTA MINING & MFG CO
CYC 75
PI WO 9732225 A1 19970904 (199741)* EN 109p G02B005-30
RW: AT BE CH DE DK EA ES FI FR GB GH GR IE IT KE LS LU MC MW NL OA PT SD SE SZ UG

W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE
GH HU IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW
MX NO NZ PL PT RO RU SD SE SG SI SK TJ TM TR TT UA UG UZ VN YU

AU 9719764	A	19970916	(199803)			
EP 883822	A1	19981216	(199903)	EN		
R: DE FR GB IT NL						
BR 9707714	A	19990406	(199920)			
CN 1217068	A	19990519	(199938)			
JP 2000506992	W	20000606	(200035)		102p	G02B005-30
MX 9807032	A1	19990101	(200051)			G02B005-30
KR 99087367	A	19991227	(200059)			G02B005-30
EP 883822	B1	20030521	(200341)	EN		G02B005-30
R: DE FR GB IT NL						

ADT WO 9732225 A1 WO 1997-US2995 19970228; AU 9719764 A AU 1997-19764 19970228; EP 883822 A1 EP 1997-907875 19970228, WO 1997-US2995 19970228; BR 9707714 A BR 1997-7714 19970228, WO 1997-US2995 19970228; CN 1217068 A CN 1997-194162 19970228; JP 2000506992 W JP 1997-531076 19970228, WO 1997-US2995 19970228; MX 9807032 A1 MX 1998-7032 19980828; KR 99087367 A WO 1997-US2995 19970228, KR 1998-706777 19980828; EP 883822 B1 EP 1997-907875 19970228, WO 1997-US2995 19970228

FDT AU 9719764 A Based on WO 9732225; EP 883822 A1 Based on WO 9732225; BR 9707714 A Based on WO 9732225; JP 2000506992 W Based on WO 9732225; KR 99087367 A Based on WO 9732225; EP 883822 B1 Based on WO 9732225

PRAI US 1996-610092 19960229

REP EP 488544; EP 506176; US 4525413; US 5217794; WO 9517699

IC ICM G02B005-30
ICS G02B005-02; G02B005-08; G02F001-1335

ICA C08J005-18; C08L025-00; C08L067-02

AB WO 9732225 A UPAB: 20030630

A light fixture comprises:(a) a light source; and (b) an optical element comprising a polymeric first phase containing a second phase dispersed in it such that the second phase is discontinuous along at least 2 of any 3 mutually perpendicular axes. The 2 phases have indices of refraction that differ along a first axis by more than 0.05 and differ along a second axis orthogonal to the first by less than 0.05. Also claimed are: (1) a combination of a light source and an optical body (detailed below); (2) an optical body having **multiple layers**, at least one of the layers comprising the 2 phases described for combination (1) above (see Claimed Combination) such that the second phase is discontinuous along at least 2 of any 3 mutually orthogonal axes; (3) a light fixture comprising a light source and an optical film as for the above optical element; and (4) a light fixture comprising a light source, a means of reflecting light produced by the light source and a means for polarizing light produced by the light source, in which the reflector and/or the polarizer comprises an optical element as above.

USE - Particularly as diffuse polarizers, but also low loss (non-absorbing) reflective polarizers or diffuse **mirrors.** The reflective polarizers are particularly useful in liquid crystal display panels, also calculators, digital watches, vehicle dashboard displays, etc. They may also be used as a thin infrared sheet polarizer. The polarizer may be constructed out of polyethylene naphthalate (PEN) or similar materials, which are good UV absorbers. The films and devices may

be used for windows, e.g. skylights or privacy windows, which provide diffuse transmission of light without transparency, glare-reducing windows or decorative windows, which transmit a specific **wavelength** of light. The devices may be used as light fittings. The films may be used in smoke detectors or in instruments which analyze light scattered by smoke particles, and as light extractors in **optical devices**, including light guides, e.g. the Large Core **Optical** Fibre, and **devices** using fibre optics to provide aircraft cockpit displays.

ADVANTAGE - The refractive **index** mismatch between the 2 phases along the material's three-dimensional axes can be conveniently and permanently manipulated to achieve desired degrees of diffuse and specular reflection and transmission. Transmission and reflection properties can be controlled by changing the thickness of the optical body. The optical material is stable to stress, strain, temperature differences and electric and magnetic fields, and it has an insignificant level of iridescence. Co-continuous systems are frequently easier to process and may impart properties such as weatherability, reduced flammability, greater impact resistance and tensile strength, improved flexibility and superior chemical resistance. Interpenetrating polymer networks (IPN) are particularly useful in certain applications as they swell but do not dissolve in solvents and they show suppressed creep and flow compared to analogous non-IPN systems.

Dwg.9A,9B/9

FS CPI EPI GMPI
FA AB; GI
MC CPI: A12-L03
EPI: U14-K01A1C

L78 ANSWER 20 OF 25 INSPEC (C) 2004 IEE on STN
AN 1997:5775954 INSPEC DN A9802-7820D-009
TI Optical constants of materials for multilayer mirror applications in the EUV/soft X-ray region.
AU Soufli, R. (Dept. of Electr. Eng. & Comput. Sci., California Univ., Berkeley, CA, USA); Gullikson, E.M.
SO Proceedings of the SPIE - The International Society for Optical Engineering (1997) vol.3113, p.222-9. 16 refs.
Published by: SPIE-Int. Soc. Opt. Eng
Price: CCCC 0277-786X/97/$10.00
CODEN: PSISDG ISSN: 0277-786X
SICI: 0277-786X(1997)3113L.222:OCMM;1-J
Conference: Grazing Incidence and Multilayer X-Ray Optical Systems. San Diego, CA, USA, 27-29 July 1997
Sponsor(s): SPIE
DT Conference Article; Journal
TC Experimental
CY United States
LA English
AB Sum rule tests demonstrate that there are deficiencies in the available optical data for materials important in **multi-layer mirror** applications, such as Si and Mo, leading to errors in the estimation of the real and imaginary parts of the **refractive** index n=1- delta +i beta (delta , beta are also known as "optical

constants"). The **refractive** index of Si is investigated in the region 50-180 eV using angle dependent reflectance measurements. It is shown that the reflectance method has limited efficiency in certain energy regions. Transmission measurements for the **refractive** index of Mo are performed in the energy range 60-930 eV. The new experimental results are used in order to form an improved, self-consistent database for the real and the imaginary part of n for Si and Mo and they are compared to the values in the 1993 atomic tables. The normal incidence reflectivities of Mo/Si and Mo/Be multilayer mirrors are calculated using the new results.

CC A7820D Optical constants and parameters; A7865E Optical properties of metallic thin films; A7865J Optical properties of nonmetallic thin films; A4278C Optical lens and mirror design; A4270F Other optical materials

CT ELEMENTAL SEMICONDUCTORS; MIRRORS; MOLYBDENUM; OPTICAL CONSTANTS; OPTICAL FILMS; OPTICAL MATERIALS; REFLECTIVITY; **REFRACTIVE** INDEX; SILICON; X-RAY OPTICS

ST multilayer mirror applications; soft X-ray region; EUV region; optical constant; sum rule tests; Si; Mo; **refractive index**; optical constants; angle dependent reflectance measurements; reflectance method; limited efficiency; transmission measurements; energy range; self-consistent database; normal incidence reflectivities; Mo/Si; Mo/Be; 60 to 930 eV; 50 to 180 eV; Mo-Si; Mo-Be

CHI Si int, Si el; Mo int, Mo el; Mo-Si int, Mo int, Si int, Mo el, Si el; Mo-Be int, Be int, Mo int, Be el, Mo el

PHP electron volt energy 6.0E+01 to 9.3E+02 eV; electron volt energy 5.0E+01 to 1.8E+02 eV

ET Si; Mo; Mo*Si; Mo sy 2; sy 2; Si sy 2; Mo-Si; Be*Mo; Be sy 2; Mo-Be; Be

L78 ANSWER 21 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN

AN 1996:443940 CAPLUS

DN 125:99614

ED Entered STN: 27 Jul 1996

TI Aluminum surfaces to be used in lighting applications

IN Gillich, Volkmar

PA Alusuisse-Lonza Services Ag, Switz.

SO Eur. Pat. Appl., 12 pp.
CODEN: EPXXDW

DT Patent

LA German

IC ICM G02B005-08
ICS G02B001-10

CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 52

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 714039	A1	19960529	EP 1995-810679	19951030
	R: AT, CH, DE, DK, ES, FR, GB, IT, LI, NL, SE				
	CH 689065	A	19980831	CH 1994-3543	19941124
	US 5856020	A	19990105	US 1995-547799	19951025
	CA 2162423	AA	19960525	CA 1995-2162423	19951108

US 5779871 A 19980714 US 1997-859807 19970519
PRAI CH 1994-3543 A 19941124
US 1995-547799 A3 19951025
AB Reflectors for lighting applications comprising a reflective aluminum surface provided with a transparent and pore-free protective layer formed from anodically produced aluminum oxide with a dielec. **constant** of 6-10.5 at 20° are described in which the protective layer has a thickness d of 60-490 nm which varies by less than ±5% over the surface and which satisfies one of the following criteria: for constructive interference, that d + n = k + λ /2 ± 20 nm; for producing a colored reflector surface, that (k + . **lambda.**/2 + 20 nm) < d + n < ((k + 1) + . **lambda.**/2 - 20 nm); or for use as a starting material for the production of reflectors with reflection-enhancing **high index-low index** multilayered films, that d + n = l + λ /4 ± 20 nm (n = the refractive **index** of the protective **layer**; λ = the central **wavelength** of the light to be reflected; k = a natural number; and l = an odd natural number). Methods for producing the reflectors are also described which include electrolytic oxidation of the aluminum surface using an electrolyte which does not dissolve the aluminum oxide at a potential U (in volts) which satisfies the relation d/1.4 ≤ U ≤ d/1.2.
ST aluminum reflector anodization alumina protective layer
IT Anodization
Illumination
Mirrors
Optical reflectors
(alumina-coated aluminum surfaces to be used in lighting applications and their preparation)
IT 1344-28-1, Alumina, properties 7429-90-5, Aluminum, properties
RL: **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(alumina-coated aluminum surfaces to be used in lighting applications and their preparation)

L78 ANSWER 22 OF 25 JAPIO (C) 2004 JPO on STN FAMILY 1
AN 1995-263806 JAPIO
TI **OPTICAL** SEMICONDUCTOR **DEVICE**
IN SUGIYAMA YOSHIHIRO
PA FUJITSU LTD
PI JP 07263806 A 19951013 Heisei
AI JP 1994-48874 (JP06048874 Heisei) 19940318
PRAI JP 1994-48874 19940318
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1995
IC ICM H01S003-18
ICS H01S003-081
AB PURPOSE: To easily manufacture an **optical** semiconductor **device** including a DBR **mirror** by returning an optical path progressing in the direction of the normal of the DBR **mirror** with the reflection of plural times and making the optical path progress again in the direction of the normal of the DBR **mirror.**

CONSTITUTION: One DBR **mirror** 3 including an alternately stacked **layer** of **plural** semiconductor **layers** with a refractive **index** which is basically different from an optical layer thickness of odd number times of &**lambda**;/4 and a returning **mirror** 4 for returning at least twice an optical path which progresses in the direction of the normal of a DB **mirror** 1 and again making the optical path progress in the direction of the normal of the DBR **mirror** 3 are provided. Thereby, a light resonance structure can be formed of one DBR **mirror** 3 and the returning **mirror** 4, thereby being able to reduce by half the required number of DBR **mirrors.** Therefore, two functional elements can be easily integrated on an optical path by changing the optical path with the returning **mirror** 4. For instance, a surface emitting type laser in which a gain part 6 and a loss part 7 are integrated can be easily formed.

L78 ANSWER 23 OF 25 INSPEC (C) 2004 IEE on STN
AN 1995:4842521 INSPEC DN A9502-4260B-048; B9502-4320C-009
TI New water-cooled argon ion laser-low-cost version.
AU Nakazawa, Y.; Nishida, K.; Akiyama, Y.; Yamada, K. (Microwave Tube Div., NEC Corp, Japan)
SO NEC Technical Journal (Oct. 1994) vol.47, no.10, p.133-6. 0 refs.
CODEN: NECGEZ ISSN: 0285-4139
DT Journal
TC Experimental
CY Japan
LA Japanese
AB At present, the water-cooled argon ion laser widely used in industrial and medical fields is in need of improvements of characteristics and performance, and the development of low cost products. To cope with these needs, 4 W new water-cooled argon ion laser, GLG3480 series, has been developed. It adopts the following techniques to enhance the quality of the laser: (1) The use of capillary materials consisting of excellent ceramics with low sputtering yield and high thermal **conductivity** ; (2) The adoption of a means by which plasma discharge is prevented from being generated at gas-return holes; (3) The reduction of operating temperature for cathode; (4) The use of the windows made of high-purity quartz; (5) The use of **multi-layer mirror** made by hafnium oxide. It achieves high performance and low cost at the same time, and has excellent output-power characteristics.
CC A4260B Design of specific laser systems; A4255F Inert gas lasers; A4278H Optical coatings; B4320C Gas lasers; B4320M Laser accessories and instrumentation
CT ARGON; COOLING; ION LASERS; LASER MIRRORS; OPTICAL FILMS
ST water-cooled; argon ion laser; low-cost version; industrial; medical; characteristics; performance; low cost products; GLG3480 series; capillary materials; low sputtering; **high thermal conductivity**; plasma discharge; gas-return holes; operating temperature; cathode; high-purity quartz; **multi-layer mirror**; hafnium oxide; output-power characteristics; 4 W; Ar
CHI Ar el

PHP power 4.0E+00 W
ET At; Ar

L78 ANSWER 24 OF 25 CAPLUS
AN 1990:620900 CAPLUS
DN 113:220900
ED Entered STN: 08 Dec 1990
TI **High index contrast mirrors** for
optical microcavities
AU Ho, Seng Tiong; McCall, S. L.; Slusher, R. E.; Pfeiffer, L. N.; West, K. W.; Levi, A. F. J.; Blonder, G. E.; Jewell, J. L.
CS AT and T Bell Lab., Murray Hill, NJ, 07974, USA
SO Applied Physics Letters (1990), 57(14), 1387-9
CODEN: APPLAB; ISSN: 0003-6951
DT Journal
LA English
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
AB A new technique for constructing multilayer dielec. **mirrors** is described that results in high reflectivities with only two or three dielec. layer pairs per **mirror.** These structures are obtained by selectively etching layered AlxGa1-xAs material grown by mol. beam epitaxy and then replacing the etched regions with acrylic resin or air. A thin optical cavity produced by this technique is demonstrated with **mirror** reflectivities near 96%. These techniques allow the fabrication of lasers, light-emitting diodes, or optical switches with high contrast ratio **mirrors** on both sides of an optically active region in order to enhance output coupling, lower laser thresholds, and increase modulation rates.
ST dielec **mirror** optical microcavity; aluminum gallium arsenide
mirror microcavity
IT **Mirrors**
(for optical microcavities, **high index**
contrast)
IT Electroluminescent devices
(**mirrors** for optical microcavities for applications in, high
index contrast)
IT Acrylic polymers, uses and miscellaneous
RL: USES (Uses)
(**mirrors** using, for optical microcavities, **high**
index contrast)
IT **Mirrors**
(laser, **high index contrast**)
IT Lasers
(**mirrors**, **high index contrast**)
IT Epitaxy
(mol.-beam, of **high index contrast**
mirrors for optical microcavities)
IT Optical instruments
(switches, **mirrors** for optical microcavities for applications
in, high index contrast)
IT 1303-00-0, Gallium arsenide, uses and miscellaneous 106097-51-2,

Aluminum gallium arsenide (Al0.28Ga0.72As) 106804-30-2, Aluminum gallium arsenide (Al0.6Ga0.4As)
RL: USES (Uses)
(**mirrors** using, for optical microcavities, **high index contrast**)

L78 ANSWER 25 OF 25 CAPLUS COPYRIGHT 2004 ACS on STN
AN 1990:128557 CAPLUS
DN 112:128557
ED Entered STN: 31 Mar 1990
TI Broadband low-reflectivity coating for semiconductor power lasers by ion-beam and PECVD deposition
AU Marclay, E.; Webb, D. J.; Buchmann, P.; Vettiger, P.
CS Zurich Res. Lab., IBM Res. Div., Rueschlikon, CH-8803, Switz.
SO Applied Surface Science (1989), 43, 43-6
CODEN: ASUSEE; ISSN: 0169-4332
DT Journal
LA English
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
AB A new type of **optical** low-reflectivity coating based on a stepwise-graded-index multilayer was designed and applied to GaAs/AlGaAs power laser **mirrors.** The coating design is based on a known principle of filter design theory (the Herpin principle) which enables an ideal graded-index film to be approximated by a much simpler combination of high and **low index** material **layers.** Only 2 materials are required (SiO2 and a-Si for instance) thus making it very easy to fabricate such coatings with standard deposition techniques such as ion beam sputtering or plasma enhanced chemical vapor deposition. The low-reflectivity region of this coating extends over a broad **wavelength** range, therefore making the overall reflectivity much less sensitive to thickness variations than is the case for single-layer coatings. The good **optical** qualities of such a coating and the ease of fabrication make it a very promising alternative to single-layer low-reflectivity coating. In particular, **optical** output power d. in excess of 10 MW/cm2 on power laser **mirrors** was measured, which corresponds to one of the highest reported values for coated **mirrors.**
ST laser **mirror** coating plasma enhanced deposition; chem vapor deposition plasma enhanced coating
IT Ion beams, chemical and physical effects
(deposition by, of low reflectivity coatings for laser **mirror**
)
IT **Mirrors**
(laser, broadband low reflectivity coating of, by ion beam or plasma enhanced chemical vapor deposition)
IT Lasers
(semiconductor, **mirrors**, broadband low reflectivity coating of, by ion beam or plasma enhanced chemical vapor deposition)
IT 14791-69-6, Argon(1+), uses and miscellaneous
RL: USES (Uses)
(deposition by, of low reflectivity coatings for laser **mirror**

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    )
IT  7440-21-3, Silicon, uses and miscellaneous   7631-86-9, Silica, uses and
    miscellaneous
    RL: USES (Uses)
       (laser mirror coatings, by ion beam or plasma enhanced chemical
       vapor deposition)
IT  37382-15-3, Aluminum gallium arsenide
    RL: DEV (Device component use); USES (Uses)
       (lasers, broadband low reflectivity coating on mirrors for,
       by ion beam or plasma enhanced chemical vapor deposition)
IT  1303-00-0, Gallium arsenide, uses and miscellaneous
    RL: USES (Uses)
       (substrate, for ion beam or plasma enhanced chemical vapor deposition of
       low reflectivity coatings for laser mirror)
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